

# sPHENIX Project Controls and Risk Registry

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# sPHENIX Project Data

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- sPHENIX is at initiation phase, ~18 month from a OPA CD-1 review
- \$20M < TPC < \$100M
- A WBS along with WBS dictionary have been established
- Both Project Tasks and Pre-Project Tasks are planned
- Preliminary cost estimates completed
- Resource-loaded schedule in Microsoft Project currently, getting ready to import to Primavera P6

# Getting ready for EVMS(1)

- CAMs for all WBS Level 2 assigned
- EVMS 2-day BNL training for Project Management and CAMs

sPHENIX Project Management	
Project Coordinator	Ed O'Brien
Project Manager -Science	John Haggerty
Project Manager-Engineering	Jim Mills
Chief Mechanical Engineer	Don Lynch
Project Controls	Irina Sourikova
Resource Coordination	Bob Ernst
ES&H	Paul Giannotti
QA	Jack Eng

1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
Management	Magnet	Tracking	EMCal	HCal	Cal. Electronics	DAQ/ Trigger	Infrastructu re	Intgrtn/ Install
I. Sourikova	K. Yip	I. Nakagawa	C. Woody	J. Lajoie	E. Mannel	C-Y. Chi	P. Giannotti	D. Lynch

# Getting ready for EVMS(2)

- Training for Project Controls:
  - great initial introduction by P.Novakova and X.Guo
  - training by R.Grubb
  - Primavera P6 3-day course by GlobalPM



# Risk Registry

- Preliminary Global and Level 2 project risks identified
- Global risks each have a risk form
- Level 2 risks have been analyzed using Labor and Materials risk rule tables shown in Slides 7 and 8.
- Items with Labor or/ and Material risk code > 4 are in the database, will have risk forms
- Select one subsystem – handy for regular subsystem meetings
- Select highest risks or costliest items – important for PM

**Show risks ( Labor or Materials risk code > 2 ) for selected WBS(s)**

Select all relevant WBSs by holding down Ctrl(windows)/Command(Mac) button

WBS	Materials & Supplies >=	Labor code >=	Materials code >=
1.2 Magnet	10,000	5	5
1.3 Tracker	50,000	6	6
1.4 EMCal	100,000	7	7
1.5 HCal	200,000	8	8
1.6 Cal Electronics	300,000	ALL	ALL
1.7 DAQ/Trigger	400,000		
1.8 Infrastructure	500,000		
1.9 Inst/Integration	600,000		
2.04 EMCal	700,000		
2.06 Cal Electronics	800,000		
ALL	900,000		
	1,000,000		
	ALL		

Show risks

# Risk Registry (cont.)

Example: risk query output. All columns are sortable.

Click on column header to sort

ID	WBS	WBS name	Task	Labor Risk	Material Risk	Materials & Supplies	Comment
41	1.05.03.03.01	Outer HCAL module production	Absorber must be stored in factory to be ready for assembly	4	4	\$50,000.00	
42	1.05.03.03.01	Outer HCAL module production	Additional (smaller) hardware necessary for building modules (brackets, support plates, etc.)	4	4	\$100,000.00	Support rings will be covered in the I&I WBS
43	1.05.03.03.01	Outer HCAL module production	Prepare procurement package for scintillator tiles, follow procurement process	4	4	\$1,199,000.00	
44	1.05.03.03.01	Outer HCAL module production	These are small parts needed to connect fibers to sensors; they may be more or less complicated depending on whether optical or electronic coupling is used	4	4	\$50,000.00	
45	1.05.03.03.02	Outer HCAL module assembly	Absorber stacking (Station 1)	4	4	\$10,000.00	
1	1.06.03.02.01	EMCal On Detector Electronics: Prototype v2	Procure all componets needed for EMCal electronics: prototype v2	3	4	\$7,500.00	
2	1.06.03.02.01	EMCal On Detector	Fabricate all PC boards required for	2	4	\$5,000.00	

# Table of Labor risk rules

	Type of Estimate	Contingency %	Description
L1	Actual	0%	Actual costs incurred on activities completed to date.
L2	Level of Effort Tasks	0%–20%	Support type activities that must be done to support other work activities or the entire project effort, where estimated effort is based on the duration of the activities it is supporting.
L3	Advanced	10%–25%	Based on experience with documented identical or nearly identical work. Development of activities, resource requirements, and schedule constraints are highly mature. Technical requirements are very straightforward to achieve.
L4	Preliminary	25%–40%	Based on direct experience with similar work. Development of activities, resource requirements, and schedule constraints are defined as preliminary (beyond conceptual) design level. Technical requirements are achievable and with some precedent.
L5	Conceptual	40%–60%	Based on expert judgment using some experience as a reference. Development of activities, resource requirements, and schedule constraints are defined at a conceptual level. Technical requirements are moderately challenging.
L6	Pre-conceptual	60%–80%	Based on expert judgment without similar experience. Development of activities, resource requirements, and schedule constraints are defined at a pre-conceptual level. Technical requirements are moderately challenging.
L7	Rough Estimate	80%–100%	Based on expert judgment without similar experience. Development of activities, resource requirements, and schedule constraints is largely incomplete. Technical requirements are challenging.
L8	Beyond state of the art	> 100%	No experience available for reference. Activities, resource requirements, and schedule constraints are completely undeveloped. Technical requirements are beyond state of the art.

# Table of Materials risk rules

Code	Type of Estimate	Contingency %	Description
M1	Existing Purchase order	0%	Items have been completed or obligated. (Note: Contact Change Orders are considered a Risk and should not be included )
M2	Procurement for LOE/ Oversight work	0%–20%	M&S items such as travel, software purchases and upgrades, computers, etc. estimated to support LOE efforts and other work activities.
M3	Advanced	10%–25%	Items for which there is a catalog price or recent vendor quote based on a completed or nearly completed design or an existing design with little or no modifications and for which the costs are documented.
M4	Preliminary	25%–40%	Items that can be readily estimated from a reasonably detailed but not completed design; items adapted from existing designs but with moderate modifications, which have documented costs from past projects. A recent vendor survey (e.g., budgetary quote, vendor RFI response) based on a preliminary design belongs here.
M5	Conceptual	40%–60%	Items with a documented conceptual level of design; items adapted from existing designs but with extensive modifications, which have documented costs from past projects.
M6	Pre-conceptual – Common work	60%–80%	Items that do not have a documented conceptual design, but do have documented costs from past projects. Use of this estimate type indicates little confidence in the estimate. Its use should be minimized when completing the final estimate.
M7	Pre-conceptual – Uncommon work	80%–100%	Items that do not have a documented conceptual design, and have no documented costs from past projects. Its use should be minimized when completing the final estimate.
M8	Beyond state of the art	> 100%	Items that do not have a documented conceptual design, and have no documented costs from past projects. Technical requirements are beyond the state of the art.



# Risk Management Plan

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# Global Risk Form

## sPHENIX Risk Form

### Risk

<b>Risk Identifier:</b>	Ed O'Brien	<b>Risk Owner:</b>	Ed O'Brien
<b>Risk ID:</b>	PM-003	<b>Risk Type:</b>	Threat
<b>Date:</b>	September 23, 2015	<b>Date revisited:</b>	November 02, 2015

understanding of the bureaucratic hurdles for hiring within the associated institutions, and examining means of streamlining the process, where possible, will also limit the potential delay. The sPHENIX collaboration contains much engineering and technical expertise. The Project has already begun considering options for other institutions to contribute engineering experts in the event of key personnel loss, and has also begun evaluating possibilities for transferring the related responsibilities to another US institution, where applicable. Given these mitigating actions, we believe we can limit the time to find a replacement for the lost key engineer to 4 months. This totals to a cost impact of \$154.5k. We estimate the post-mitigation overall impact to be low, and the probability to be 20%.

**I. Risk Title:** Loss of key personnel during Project.

**II. Risk Description:** The design, prototyping and construction of sPHENIX deliverables in some cases depend on a few key engineers for their successful completion. In a few of these cases, finding a replacement would take some time. This would result in increased costs resulting from carrying more junior personnel through the transition period, and a schedule delay.

**III. Detailed Risk Cause:** The loss of such key personnel can be due to retirement, other employment offers, personal factors that influence the ability or willingness to continue working on a deadline-driven Project, or death.

**IV. Detailed Risk Effect:** The Project could lose key expertise that is often integral to subproject completion. Such personnel are not always easy to find, and a search would have to be conducted, with the personnel replaced and trained before progress would again be made.

**V. Risk Analysis:** In a few key areas, the completion of the deliverables depends on a small number of unusually skilled engineers, who are working within Nuclear Physics (NP) community and have expertise in NP specification and requirements. The loss of these personnel, either to retirement, other employment opportunities, personal reasons or death, can slow down the progress of tasks the personnel is responsible for. The time required to replace very skilled engineers can be long, and this is why loss of key personnel is considered as a global risk. We identify four engineers on the Project in this category, of which we assume one might be at risk in the manner described above. We estimate the delay in finding and training a replacement for such engineer to be 6 months. During this delay, supporting a more junior engineer and a technician would be required, which translates to a fully burdened cost of \$130.4K and \$101.4K respectively, with a total pre-mitigation cost of \$231.8K. We estimate the pre-mitigation overall impact to be moderate, and the probability to be 30%.

**VI. Mitigation Plan or Risk Mitigation Measures:** This risk can be mitigated by identifying early those engineers who play key roles on the Project. Gaining an early